

Institute of Sedimentary and Petroleum Geology

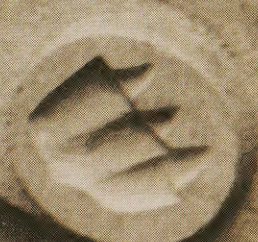
Government
Publications

Calgary, Alberta

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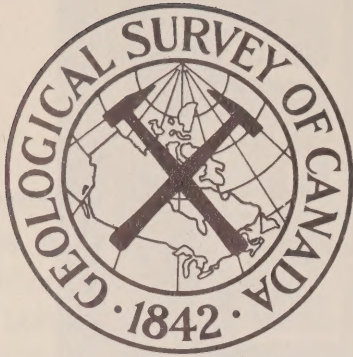


Cover design shows part of sculpture
by Katie Ohé in Institute lobby

Queen's Printer for Canada
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[General publications]

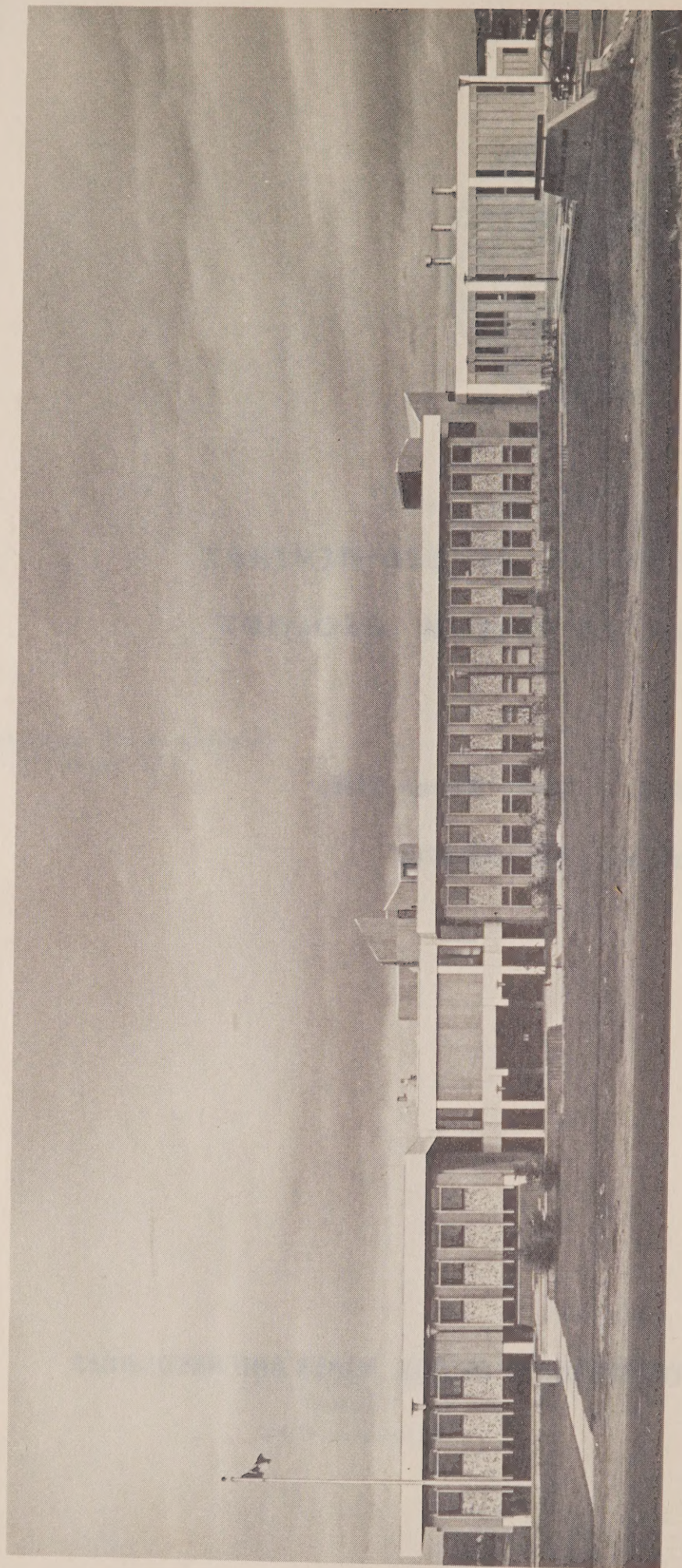
[6-7] **INSTITUTE of SEDIMENTARY
and PETROLEUM GEOLOGY**

3303 - 33rd Street NW,

Calgary 44, Alberta

Canada

DEPARTMENT OF ENERGY, MINES AND RESOURCES



INSTITUTE OF SEDIMENTARY AND PETROLEUM GEOLOGY BUILDING, CALGARY, ALBERTA

INTRODUCTION

The Geological Survey of Canada is one of the oldest scientific organizations in the Government of Canada. William Logan was appointed its first geologist in the spring of 1842 and since then the Survey has been in continuous operation. It is one of the oldest Geological Surveys in the world, that of the United Kingdom having been established in 1835 and of the United States in 1879.

In Western Canada the story of Geological Survey work is particularly noteworthy. The names of Selwyn, Dawson, Bell, McConnell, Tyrrell, Dowling, McInnes, Keele, Cairnes, and Camsell are only some of the better known of the officers of the Geological Survey who were the first to traverse uncharted areas, to report on the geology and mineral possibilities, and to point out fields attractive to the prospector. Detailed mapping of many such favourable areas followed. Geological mapping with accompanying stratigraphic and structural studies in Alberta has been the basis for the development of the coal and oil resources of that region; similarly, geological mapping in the mountain belt to the west has been of vital importance in aiding mineral development in British Columbia and the Yukon.

The first comprehensive geological work in Western Canada began with George Mercer Dawson's survey along the 49th Parallel in 1873-74. His report to H.M. North American Boundary Commission is recognized as a classic in geology. In 1875 he was appointed to the staff of the Geological Survey of Canada and his subsequent accounts of geological explorations in western and northern Canada are marvels of accuracy. J.B. Tyrrell and R.G. McConnell were among Dawson's assistants on many of his trips and, later, carried on geological reconnaissance work in the plains and mountains of Western Canada. Alfred R.C. Selwyn, who followed Logan as Director in 1869, headed the first expedition into central British Columbia and the Peace River country.

In subsequent years, Selwyn, Dawson, McConnell, Tyrrell and others, right down to the present day, have continued their geological explorations and studies in Alberta, in British Columbia, in the Yukon Territory, and in parts of the Northwest Territories. Detailed geological work in the Northwest Territories did not proceed as rapidly as in those regions closer to the main routes of travel, however in recent years, geological mapping and stratigraphic studies have been accelerated in the northern parts of the Districts of Mackenzie and Franklin.

The first geologist of the Survey to work in the Arctic was Robert Bell (1884, 1885, 1897). In 1903, A.P. Low commanded an expedition travelling in the ship "Neptune" which lasted 15 months. Low wintered in the Arctic and returned the following October after having surveyed and explored parts of the coasts of several islands. In 1925, L.J. Weeks represented the Geological Survey on the annual cruise to northern waters of CGS "Arctic". Geological information was obtained at several places on Ellesmere, Devon, and Baffin Islands. Y.O. Fortier, present Director of the Geological Survey, in 1947 travelled by R.C.A.F. plane to the region of the North Magnetic Pole in the western Arctic as a member of a Dominion Observatory party. Numerous flights were made over parts of the mainland and islands and geological observations were made at points of landing.

Systematic geological work in the Arctic Islands began after World War II and, between 1947 and 1955, several officers of the Survey were engaged in geological reconnaissance surveys at numerous places in the Arctic Islands. The method of travel was by canoe and dog-sled. A change in Arctic work took place in 1955 with Operation Franklin, a major aircraft-supported (helicopter and fixed-wing) project involving nine Survey geologists with support staff. Almost all parts of the Arctic have now been mapped at least on a reconnaissance scale and a large amount of stratigraphic, structural, petrological, paleontological and mineralogical information has been collected; studies in such fields as economic geology, Quaternary geology and geochemistry have been undertaken and an aeromagnetic survey program is now in progress.

The Institute of Sedimentary and Petroleum Geology includes many units of the former Fuels and Stratigraphy Division and the regional office of the Geological Survey which was set up in Calgary in 1950. It functions as a Division of the Geological Survey, and operates as an integrated research unit with its own budget, financial administration, and, subject to Departmental and Branch policies, its own program of scientific research.

The Institute provides, through field and laboratory research, scientific information concerning the geology of the western and northern sedimentary basins. By publication and other means, this information is directed to the public, industry, universities, and professional societies, for the purpose of furthering scientific knowledge, mineral exploration, land-use planning, and general economic development in the region. In addition, the Institute is responsible for the custody of drilling cores, samples, and other data resulting from exploration activities by industry in all provinces and territories of Western Canada, and submitted, as required, to federal administration in conformity with regulations. Appropriate facilities are provided for the examination and study of such cores, samples, and other data, with due consideration given to security requirements of industry and government. Furthermore, it stores and curates collections of rocks, fossils and minerals, in order to furnish reference materials for scientific research and support for published descriptive accounts of regional geology, biostratigraphy, and petrological studies. The Institute library is a growing collection of more than 50,000 items supporting the scientific activities and providing a service to the community for those engaged in research in all phases of sedimentary geology and the exploration for petroleum.

The implementation of such a diversified but integrated research and service program is carried out to the maximum extent possible in collaboration with other governmental agencies, both federal and provincial, and with universities, scientific societies, and industry. Several collaborative projects have been initiated with industry, in order to increase the volume of data and information that can be released to the general public. Particularly close collaboration is enjoyed with the University of Calgary, both at the instructional level and between research laboratories.

In addition to the scientific, administrative, and support staff of the Institute, the building houses units from other Divisions and Branches of the Department of Energy, Mines and Resources. These include Pleistocene geologists of the Division of Quaternary Research and Geomorphology of the Geological Survey; groundwater scientists with supporting technicians and secretarial staff of the Hydrological Sciences Division of the Inland Waters Branch; a section of the National Air Photographic Library; a field office of the National Energy Board; a Mining Research Centre of the Mines Branch; and the office of the departmental district purchasing Agent.

Officers of the Geological Survey of Canada located at the Institute of Sedimentary and Petroleum Geology in Calgary are responsible for interpreting the geology of the sedimentary strata lying between the Canadian Shield and the Rocky Mountain Trench and between the 49th Parallel and the Arctic coast, as well as the Arctic Archipelago. They include specialists in structural geology, stratigraphy, sedimentary petrography, paleontology, mineralogy, and the geology of petroleum, and are today following up the early exploratory and reconnaissance work of the Survey with more detailed and sophisticated studies in an effort to aid the expanding resource industries and to support governmental control of exploitation, land-use, and preservation of the environment.

This booklet describes the scientific program of each research section within the Institute, the laboratories, the services provided for research by the staff or approved research associates, and the services made available to the public, industry, and other research organizations. These functions are set in the physical framework of the building in which the Institute is housed with a brief description of the plant. A staff list is appended.

THE INSTITUTE

Arctic Islands Section — The principal responsibilities of the section are the interpretation of the stratigraphic and structural history of Phanerozoic sedimentary rocks of the Arctic Archipelago, and the Evaluation of the economic potential of these strata. A secondary objective is research on the relationship of tectonic features of the Arctic Islands to continental and oceanic structures and history. Progress toward the solution of these problems is attained by means of investigation of bedrock geology of the Arctic Islands and the adjacent mainland coasts. The results of such investigations are published as interpretive geological maps and regional reports that describe all aspects of bedrock geology. In addition, the section, in conjunction with other sections of the Institute, carries out and reports on special studies in stratigraphy, paleontology, sedimentology, sedimentary petrology, structural geology, and petroleum geology. Such studies are directed particularly toward understanding the principal processes involved in the formation of sedimentary rocks and accumulation of petroleum.

Structural Geology Section — The Structural Geology Section is responsible for the definition of the structural framework and physical evolution of the Western Canada Sedimentary Basin and of the Canadian Cordillera east of the Rocky Mountain Trench and northeast of the Tintina Valley; for the definition of areas of economic potential in minerals and fossil fuels in these regions; and for basic research into the mechanics of deformation of layered media as it may relate to the migration and accumulation of oil and gas and the localization of deposits of mineable coal. These responsibilities are commonly carried out in conjunction with stratigraphic and paleontologic investigations within the Institute. In addition, the section is carrying out detailed studies of specific geological structures representative of the geometry and style of the deformation in the eastern and northern Cordillera. In conjunction with model experiments, these structures will be analyzed so that the tectonic evolution along and across the Cordillera may be known.

Maps and reports arising from collaborative endeavors such as Operations Porcupine, Liard, Norman, and Smoky, and from individual programs, are made available through publication and Open File. They have assisted industry greatly in its search for hydrocarbons in northern Yukon Territory and District of Mackenzie, in northeastern British Columbia and in the foothills of Alberta. Scientific contributions to the understanding of the deformational geometry and mechanics of specific structures are published by the Geological Survey and in technical journals.

Paleozoic Stratigraphy Section — Members of the section conduct research into the nature, distribution and origin of Paleozoic rocks, both in outcrop and in the subsurface of the sedimentary and diagenetic processes responsible for their origin, present state, and description of local rock sequences, and their correlation and relationship with other sequences. These data are used in the synthesis of a stratigraphic framework for deciphering the geological history of a region. An integral part of the research is the study of the composition, texture and structure of the rocks themselves, and the interpretation of the sedimentary and diagenetic processes responsible for their origin, present state, and distribution. Much of the work is done in collaboration with scientists of other disciplines

within the Institute as well as with other government agencies and universities. Some of the collaborative projects involve studies in other parts of Canada outside the area of prime responsibility.

The study of Paleozoic rocks is not only of broad philosophical interest in contributing to the overall geology of Canada, but is also of great practical value in the search for and utilization of the resources these rocks contain, resources that include the fossil fuels (oil and gas), metalliferous deposits (lead and zinc in Great Slave Lake area), potash, halite and other salts in the Elk Point Basin, gypsum in northern Alberta and southern District of Mackenzie, and high-calcium limestone and other industrial materials.

Mesozoic Stratigraphy Section — The section is responsible for research in stratigraphy and sedimentology of mesozoic rocks in the eastern Cordillera and Plains. The program is directed primarily to gathering basic data from surface and subsurface rocks and includes studies of carbonate and clastic petrology. These investigations provide insight into sedimentary processes, environments of deposition, and diagenesis of sediments, particularly clastic sediments, and leads to an appraisal of their potentialities as reservoirs and/or sources of oil, gas and coal.

This work is carried on in collaboration with other scientists involved in areal geological, paleontological and palynological studies, not only within the Institute but also in other governmental agencies and universities. An extensive program is developing in the field of clay mineralogy and collaborative research and service determinations for scientists within the Geological Survey, particularly within the division, are carried out in the clay mineralogy and clay chemistry laboratories. In addition, members of the section are participating in major mapping programs in northeastern British Columbia. They are also involved in long-term, multidisciplinary investigations of the Mackenzie Delta and Beaufort Sea which will provide basic geological data for the interpretation of the sedimentary column, the development and structure of one of the world's major deltas and neighboring basins, and ultimately will result in an evaluation of the natural resources of the region.

Western Paleontology Section — The section is responsible for research in biostratigraphy, invertebrate paleontology and palynology in the Yukon Territory, the Districts of Mackenzie and Franklin, and the western provinces. Both surface and subsurface studies are conducted and the section has begun an extensive program for the study of fossils from cored intervals of wells drilled in the Yukon and the Northwest Territories. The establishment and continued refinement of biochronological zonation of the Paleozoic and Mesozoic sediments forms an essential part of the exploration of the natural resources of the rocks of this vast region. The section works closely with other sections of the Institute and of the Division of Crustal Geology, particularly in stratigraphic and paleoecological studies; some such projects are conducted in collaboration with geologists from universities and industry.

Petroleum Geology Section — The primary responsibility of this section is to conduct research in the field of petroleum geology. Particular attention is devoted to problems of a general regional nature and of a type not commonly attempted by industry. Such problems include: studies of oil occurrence on a basin-wide scale; regional distribution of low molecular weight hydrocarbons in fine-grained rocks; alteration of carbonaceous

organic matter with depth; and testing a commercial surface prospecting method for hydrocarbon. Much of this work is being done in co-operation with industry and other organizations.

The section is responsible, also, for organizing the flow of subsurface information in the Institute and in helping to formulate policies regarding the use of such information both internally and by the public. It co-ordinates the work on the schedule of wells for the Northwest Territories and aids in the planning and co-ordination of integrated projects related to petroleum geology by one or more other sections of the Institute.

A further function is to maintain an active liaison between the Geological Survey and the petroleum industry. Information is gathered on research activities (organization and function) of other institutions, either public or private, working in the field of petroleum geology, and considerable assistance is given to outside technical and professional organizations.

Senior Research Scientists — Two Senior Research Scientists advise the Director of the Institute on scientific programs relating to surface and subsurface problems in stratigraphy and sedimentation. In addition they carry out independent research.

One of these officers studies and investigates the subsurface stratigraphy and correlation of the Devonian of Western Canada and Northwest Territories; in particular, the delineation of facies distribution and subsurface structures in order to ascertain general areas of economic potential.

The other officer is engaged in reconnaissance studies of Paleozoic stratigraphy and in detailed studies to refine the stratigraphic framework of the Arctic Islands. A comprehensive series of geological maps is being completed simultaneously with this work. In addition, research on ostracoderm fishes, graptolites, and fusulinids is carried out in an effort to solve Silurian-Devonian stratigraphic and biostratigraphic problems of the Arctic Islands.

Staff Geologist — The Staff Geologist advises the Director of the Institute on the technical and scientific requirements of the laboratories and their technicians; he is responsible for the administration of the core and sample repository and the application of the regulations governing their examination by the public and the Institute staff. Furthermore, he conducts independent scientific investigations on the coal deposits of western and northern Canada and maintains an inventory of the reserves of these deposits.

Scientific Editor — The Scientific Editor is responsible for the overall organization and co-ordination of the Manuscripts and Cartography Section; for ensuring that the cartographic facilities of the Institute are employed efficiently; for supervising the distribution of publications and maps of the Department of Energy, Mines and Resources; for making selected information available to industry and the public prior to publication by maintaining an Open File system; and, by various means, to make the public more aware of the large amount of geological and related information available to it. In addition, the Editor is responsible for appraising and processing all manuscripts submitted for publication by officers of the Institute to ensure that data and conclusions are clearly and concisely presented, and for scrutinizing all manuscripts for publication in scientific journals (other than the Geological Survey of Canada) prior to submission for publication.

Postdoctorate Research Fellow — National Research Council Postdoctorate Fellowships are tenable at the Institute and will be reviewed annually. Fellowships are for one or two years and may be in any field of research for which the Institute can provide facilities and necessary assistance in the laboratory or the field.

THE BUILDING

Pre-construction planning indicated functional requirements for three main areas: (1) a laboratory area with office space for scientists; (2) a core and sample storage area with examination facilities for the public; and (3) an administrative area. Provision was to be made for future independent expansion of each of the three main areas.

The above requirements are met by the two-storey, U-shaped building. The south wing contains the laboratories and scientists' offices, the north wing houses the core and sample storage and examination areas, and the administrative services are in the bar joining the two wings. Each of the three areas can be independently expanded laterally (see plans at end of brochure).

Construction was completed in March 1967 and the building was officially opened on September 5, 1967. The gross area is 91,350 square feet and the net area is 61,170 square feet. Expansion to the core and sample storage areas, providing an additional 7,200 square feet, was completed early in 1970.

Local materials and supplies were used as much as possible. The exterior facing features precast concrete panels with an exposed cobble-sized aggregate. The aggregate was obtained from a source a few miles south of Calgary. The lobby floor, both first and second floor, is flagstone that occurs about fifty miles west of Calgary. This flagstone is locally known as Rundle Stone and is from the Spray River Formation of Triassic age. The white dolomite in the lobby balustrade is from the Creston area, British Columbia.

The wall sculpture in the lobby is the work of a local artist, Miss Katie Ohé. Done in concrete with exposed aggregate of buff- and pink-coloured dolomite it is the artist's impression of the rock structures and deformation peculiar to each of the five tectonic provinces of Canada.

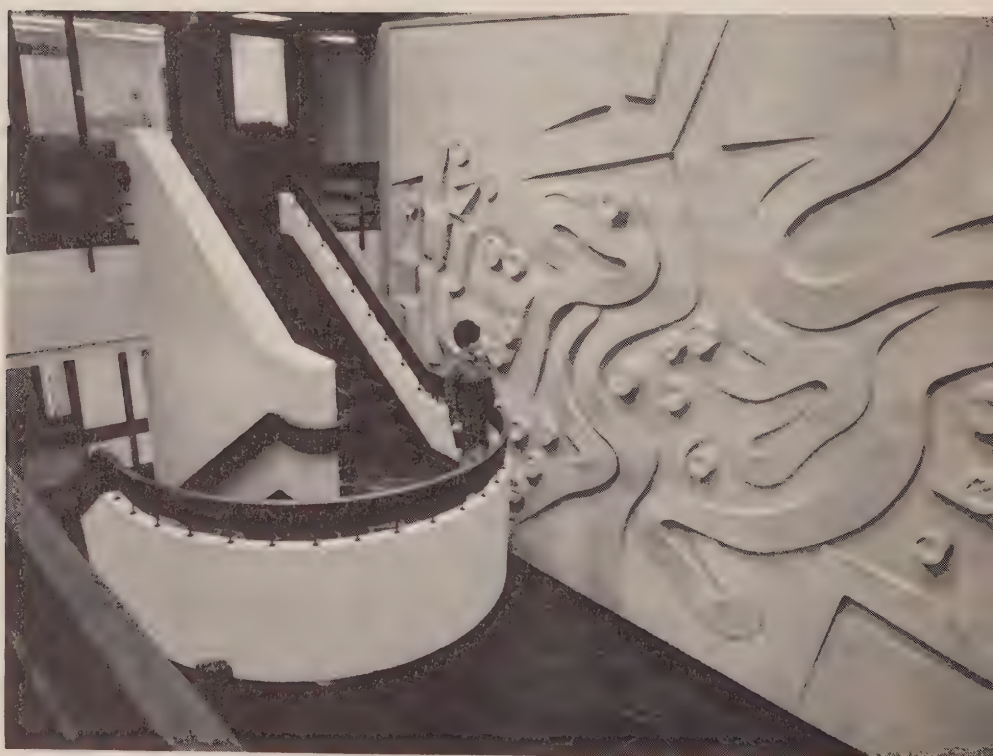
Throughout the building almost all non-bearing walls are moveable to allow for easy reshaping of rooms. Except for core and sample storage all areas are air conditioned. A well equipped canteen operated by the Canadian National Institute for the Blind is available for staff and visitors.

Central to the laboratory wing and extending its entire length is a six-foot-wide service core providing unobstructed horizontal and vertical runs for all services including hot and cold softened water, distilled water from a central still, natural gas, compressed air, vacuum, and electric power of various voltages. The laboratories are arranged along both sides of the service core and opposite to them across a corridor are the scientists' work stations. The service core-laboratory layout provides great flexibility in rearranging laboratory areas.

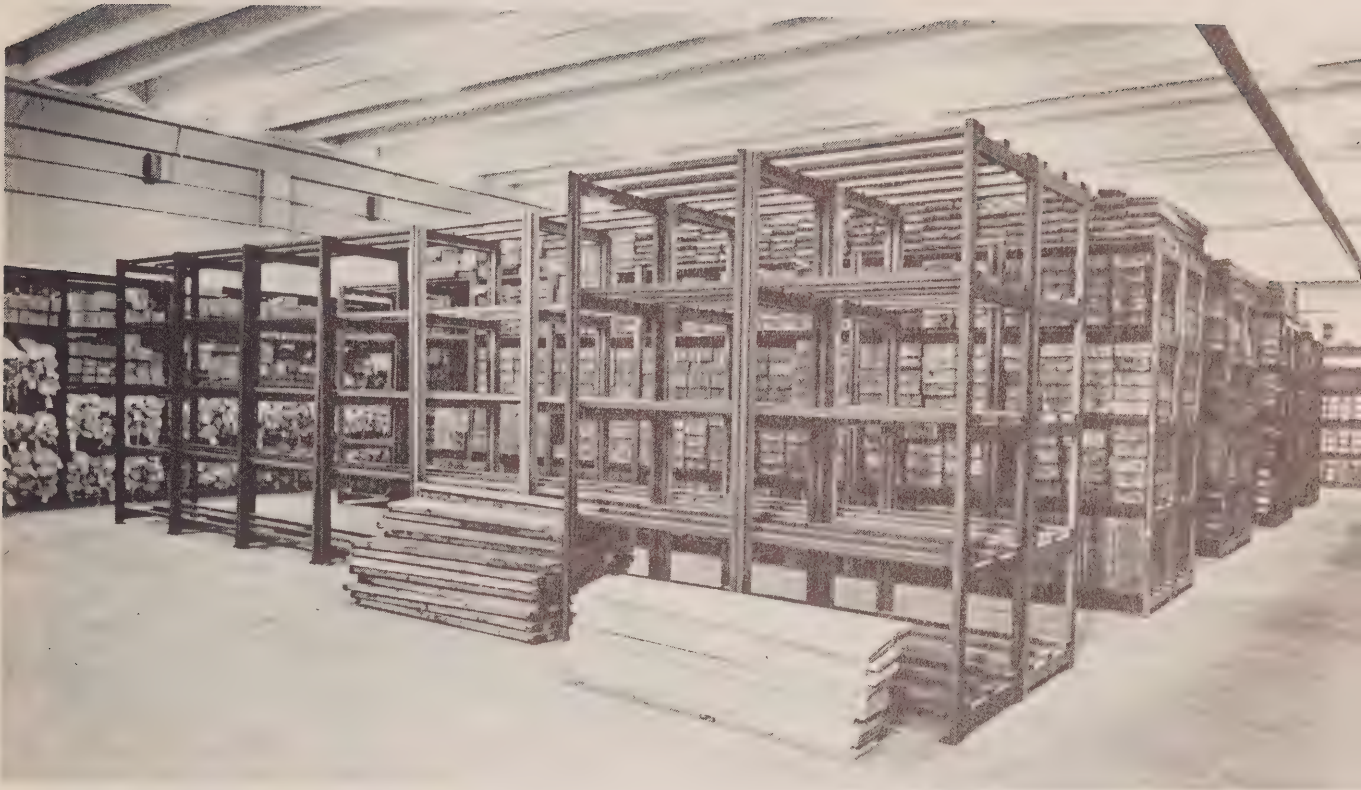
The standard laboratory module is 12 feet X 20 feet and the scientists' work stations are 12 feet X 18 feet. In all cases the walls between adjoining laboratories and between adjoining work stations are moveable to allow for any sized room.



MAIN ENTRANCE AND LOBBY



WALL SCULPTURE
FACING
MAIN ENTRANCE

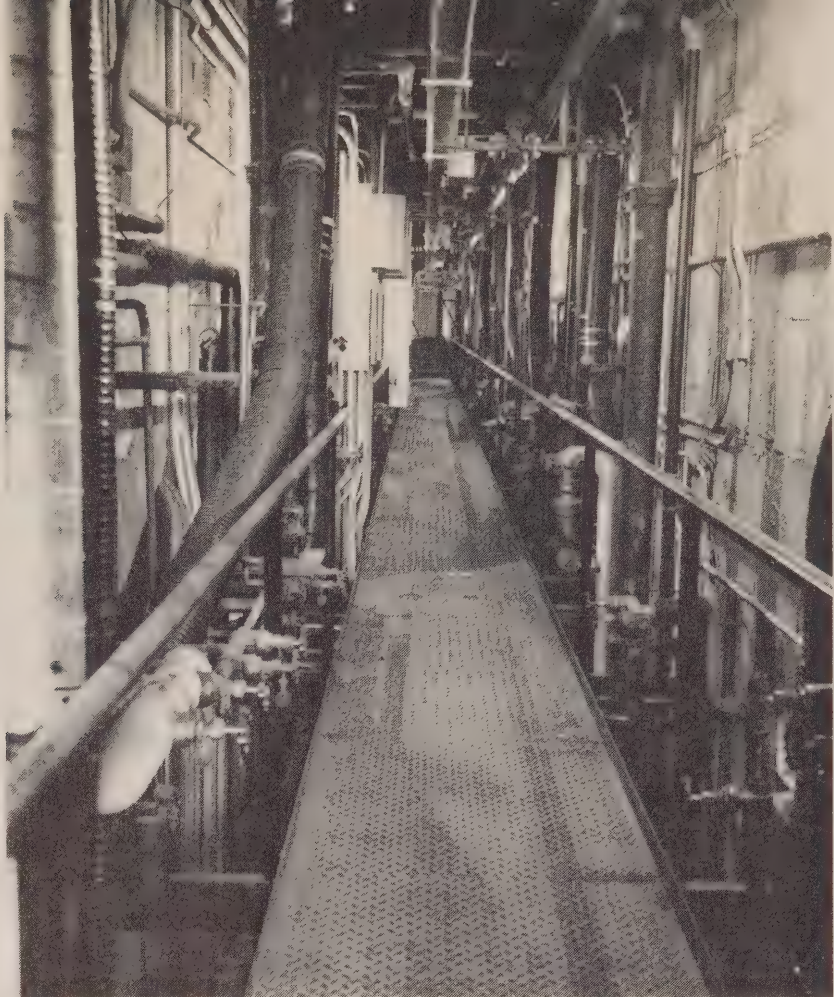


CORE STORAGE



CORE EXAMINING TABLES WITH TRAVELLING DESK

VIEW ALONG
ONE CAT-WALK
OF SERVICE CORE



GRINDING THIN SECTIONS, SEDIMENTARY PETROLOGY LABORATORY

The administrative services area contains offices for the administrative staff as well as areas where services are provided to the public. Included in the latter are the library, the publications distribution room, the air photograph library and the well files.

Structural Mechanics Laboratory — In conjunction with detailed studies of specific geological structures in the eastern and northern Cordillera of Canada, kinematic model studies are being carried out to evaluate the nature, sequence and timing of structural events in the Laramide Orogeny. Restoration of the sedimentary prism can then be made with assurance to delineate facies trends and structures favorable to the migration and accumulation of natural hydrocarbons. Collaborative studies with the Calgary office of the Mining Research Centre are conducted to evaluate the effects of geological structure on the strength and stability of rock masses about mining excavations.

Sedimentary Petrology Laboratories — The Sedimentary Petrology Laboratories contain separate but adjacent facilities for the study of clastic and carbonate sediments. A full-time technician is employed in these laboratories to carry out many types of analyses and techniques on request. These include: the preparation of nonroutine thin sections (e.g. oversized, specially mounted or specially oriented, or epoxy-impregnated); polished sections and acetate peels; various types of staining and etching; grain-size analysis by sieve and pipette methods; insoluble residue preparation; and the separation of heavy and magnetic minerals. Rough work for many sedimentary petrology projects is accomplished by means of a variety of trim saws, slab saws, rock crushers and pulveriser, sample splitter, and "ro-tap" sieve shaker, all of which are located in the sample preparation room on the ground floor of the building. Equipment in use within the laboratories includes an ultra-sonic sifter, a high-capacity centrifuge, an isodynamic separator, precision balances, a drying oven, fume hoods, and a wide assortment of glassware and related materials for general purposes. Near the main laboratories is a microscope laboratory containing high quality polarizing optical microscopes with related photomicrography equipment, and luminescence petrography equipment used in the study of carbonate minerals and textures.

Clay Mineralogy Laboratory — The clay mineralogy laboratory provides qualitative and semi-quantitative identification of clays and clay size minerals in sedimentary rocks. The laboratory is equipped with an X-ray diffraction unit with powder and flat cassette cameras and a goniometer with X-ray curved crystal focusing monochromator. Equipment for sample preparation includes a swing mill, semiautomatic hydraulic pellet press, mechanical stirrers, shakers, oven, vacuum oven, muffle, water baths, resin column for mineral purification, centrifuge, glassware and reagents. Specimen preparation and operation of the X-ray equipment are performed by a mineralogical technician.

The aim of the laboratory is (i) to identify and examine the distribution of clay mineral facies geographically and stratigraphically, and to investigate relationships between clay mineral facies distribution and other stratigraphic parameters; (ii) to identify, qualitatively and semi-quantitatively, clays and clay-size minerals in samples submitted by the scientific staff of the Geological Survey of Canada; (iii) to improve and devise new methods of mineral identification; (iv) in conjunction with the inorganic chemistry laboratory to investigate clay synthesis, diagenesis, halmyrolysis, equilibria, methods to separate clay minerals, and to study mineralogical transformations of clays.



X-RAY DIFFRACTION UNIT, CLAY MINERALOGY LABORATORY

FLAME PHOTOMETER IN CHEMISTRY LABORATORY



Inorganic Geochemistry Laboratory — The inorganic geochemistry laboratory provides qualitative and quantitative determination of all major and most minor elements occurring in clays, clay-size minerals and sedimentary rocks. All facilities, glassware and reagents necessary for precise classical wet chemical analysis are available. The laboratory is equipped with an atomic absorption spectrophotometer, flame emission photometer, colorimeter, differential thermal analysis unit, thermogravimetric balance, two Leco induction furnaces — one with an automatic carbon analyzer and the other with an automatic sulphur analyzer, a titration unit, two pH meters — one for measurement of hydrogen-ion concentration and the other for ferrous and ferric determinations, oven, hot plates, water baths, and analytical balances.

The laboratory provides quantitative analysis of major and minor constituents in samples of sedimentary rock submitted by the staff of the Institute. In addition, research is directed towards improving and determining new methods for elemental analyses of sedimentary rocks and, in conjunction with the X-ray facilities, to carry out other investigations related to the chemistry of clays.

Organic Geochemistry Laboratory — The organic geochemistry laboratory provides routine semiquantitative analyses of low molecular weight hydrocarbons as well as total organic carbon in fine-grained rocks. Other types of analyses are done on occasion. The laboratory is equipped with a dual flame ionization gas chromatograph, a single flame ionization — single column gas chromatograph, carbon analyzer, chromatography columns, soxhlet extractors, analytical balances, hermetic blenders, and an oven. Analyses are performed by a chemist experienced in organic geochemistry.

Initial research studies will determine total carbon and gaseous hydrocarbon concentrations in potential source rocks of Western Canada and particularly in the Northwest Territories.

Paleontological Laboratories — There are three separate paleontological laboratories, each staffed by technicians responsible for the preparation of fossil samples prior to study by the scientists of the Institute.

The macropaleontology laboratory includes a curating office and a preparation laboratory. Fossils awaiting study and those that have been identified and dated are catalogued and stored in steel cabinets in a basement storage area. Macrofossils are prepared using diverse techniques involving rock-grinding equipment, diamond saws, hot-plates, microscopes, ovens and a variety of materials necessary for the production of thin-sections, rubber and plaster casts and the extraction of fossils from rock-matrix by mechanical and chemical means.

In the micropaleontology laboratory, samples are catalogued and curated for locality and stratigraphic data. Each sample is then disintegrated by mechanical, chemical or other procedures and picked to obtain contained microfossils. The bulk of the picking is performed by contract under the supervision of the laboratory. Scientific support functions include compilation of distribution charts for studied microfossils, maintenance of card indexes of species, photomicrography and the schematic comparison of microfossil data from wells with electric and lithological plots. The equipment used in the laboratory includes chipmunk crushers, disintegration rollers, ultrasonic generators, fume hoods, microscopes and cameras.

In the palynology laboratory, organic-walled microfossils such as pollen and spores are liberated from rock matrices and concentrated by chemical and other means. The resulting palynological residues are mounted on microscope slides ready for study by the scientific staff. Equipment and supplies used in the laboratory include fume hoods, electrical centrifuges, acid-proof sinks, slide warming tables, microscopes with camera attachments, several types of acids and many other chemicals.

SERVICES

Cartography — The function of this unit is to provide drafting and reproduction services for the geological staff and to process the submitted manuscripts through compilation and final drafting until they are ready to be sent to the printer. The bulk of the work consists of maps, both black and white and multicoloured and figures to illustrate the various types of reports published by the Geological Survey of Canada. In addition, many illustrations are drafted for papers and reports published outside the Geological Survey and numerous slides are made to illustrate papers given by the professional staff at conventions throughout the world.

To ensure high quality drafting and, ultimately, the finest reproduction, scribing is the method used to prepare all maps and illustrations.

The facilities of this unit include drafting, compilation, print and reproduction rooms. The whole unit is temperature and humidity controlled to ensure maximum stability of materials used.

The drafting room is equipped with custom-built drafting tables each with its own built-in light table, with map and plan files, files for vertical storage of negatives, and a large light table for layout work. The compilation room is equipped with drafting tables, a large light table for layout work, and a Saltzman Model 70A Autofocusing Reflecting Projector. The print room equipment consists of four stainless steel processing tanks each 5 feet by 4 feet and supplied with separate temperature-controlled, softened and filtered water. All printing is done on a Douthitt (40" X 60") vacuum frame using a standard carbon arc or a Colight for exposure. An etch table is used for sensitizing scribe-coat and colour proofs, and a Harris Key Register Punch is used to get proper registration of negatives for coloured maps.

Library — The library is the most comprehensive geological research library in Western Canada and continues to expand. It contains literature on the stratigraphy, paleontology, mineral occurrences, fuel reserves, petroleum and general geology of Canada and many other countries. It is a depository library for the publications of many geological agencies and societies throughout the world. The collection numbers approximately 50,000 items (books, periodicals, and other miscellaneous material, excluding maps) and is arranged according to the Library of Congress classification system. Approximately 500 periodicals are received regularly. The services of a Russian translator are available for the translation of title pages, contents, and captions and for scanning of Russian literature at the request of the scientific staff.

The library is primarily responsible for providing a complete bibliographic service for the research program of the Institute, but inter-library loan facilities are provided to other libraries, to the geology faculty of the University of Calgary, and to certain accredited



CARTOGRAPHY
DRAFTING OFFICE



CARTOGRAPHY —
VACUUM FRAME
IN PRINT ROOM

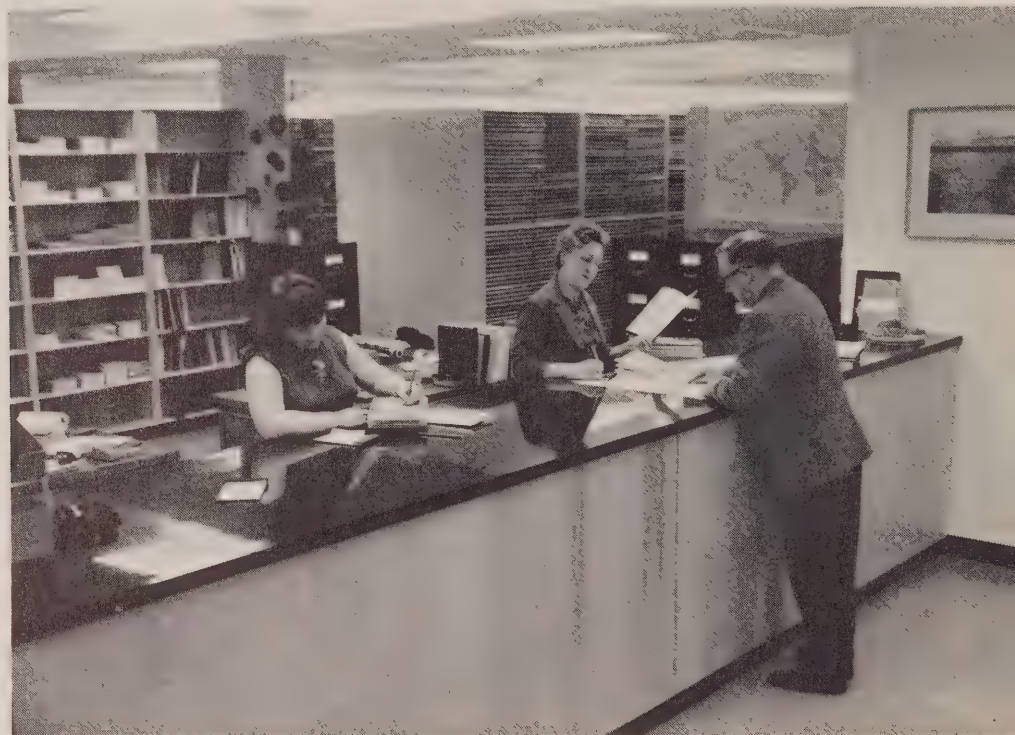


LIBRARY
READING ROOM

borrowers who do not have access to library facilities. A reading room where current publications and periodicals are displayed is open to the public. Reference and photocopying services are not available to the public but the catalogue and the extensive reference collection and other material may be consulted in the library.

Publications Unit — This unit is responsible for the distribution to the public of geological maps and reports of the Geological Survey covering the whole of Canada; aeromagnetic maps of the Geological Survey covering the whole of Canada; and topographic maps of the Surveys and Mapping Branch covering areas west of the Canadian Shield including the western Provinces, Yukon, Northwest Territories, and Arctic Islands. Also available at this office are numerous miscellaneous and special publications of the Geological Survey and other Branches of the Department of Energy, Mines and Resources.

SALES AREA AND
STOCK ROOM FOR
DEPARTMENTAL
PUBLICATIONS



Instrument Development Shop — Development, modification and repairs of laboratory machinery and equipment, as well as repairs and maintenance of plant equipment is carried out by two highly skilled men. The shop contains a high-precision lathe, milling machine and drill press and, also, standard equipment such as a drill press, band saw, lathe and welding equipment. An adjoining shop for woodworking includes a drill press, table saw, jig saw and planer.

Lapidary — Petrographic thin sections and polished sections are prepared by an experienced technician. Equipment includes diamond slab saws and trim saws, lapidary wheels, polishing equipment and an automatic thin-sectioning machine capable of grinding twenty standard size sections at one time.

Core and Sample Repository and Examination Areas — About 10,000 boxes of cores from all wells drilled in areas under Federal Government jurisdiction are stored in the



INSTRUMENT
DEVELOPMENT SHOP

Institute and are available to the public for free examination. These areas include the whole of the Yukon and Northwest Territories, the continental shelves, and Hudson Bay. Examination is facilitated by eight specially designed tables in a room adjacent to the storage area.

Some 8 million samples from cuttings of all wells drilled in Western and Arctic Canada are stored at the Institute. With the exception of samples from Alberta, all are available to the public for free examination in our excellently equipped examination room that can accommodate 15 visitors. Alberta cores and samples may be examined at the Alberta Oil and Gas Conservation Board which is situated adjacent to the Institute.

In support of the core and sample examination facilities, Well Files contain all the mechanical logs and other data related to the some 50,000 wells drilled in Western and Arctic Canada.

Photography — A photographic technician provides photographic services that include photography of rocks and fossils, slide duplicating, copying photomicrographs of thin sections as well as general photography. This laboratory contains two dark rooms (one for colour and one for black and white developing) and photographic equipment such as a Linhof Technika 4" X 5" camera with all accessories and an Asahi Pentax Model S1, 35 mm camera complete with all accesories.

STORAGE AREA FOR DRILL CUTTINGS



FACILITIES FOR EXAMINATION OF
DRILL CUTTINGS BY VISITING GEOLOGISTS



QUATERNARY RESEARCH AND GEOMORPHOLOGY DIVISION

Calgary Unit — Geological Survey of Canada

This unit currently comprises three geologists and one laboratory technician and conducts investigations in the Prairie Provinces, British Columbia, Yukon Territory and the Northwest Territories. Its functions are to conduct research on unconsolidated deposits and associated organic remains, geomorphology, and geological processes; to reconstruct physical and biological environments and their history during the Quaternary Period; and to provide information pertinent to such fields as forestry, agriculture, engineering, groundwater, mineral exploration and archaeology.

Much of the field research is conducted in conjunction with projects of the Institute, especially in northern areas where helicopter support is required. Drilling programs are conducted in the Prairie Provinces to determine subsurface Quaternary stratigraphy. Samples obtained in such drilling are curated and stored separately from those in the Core and Sample Repository of the Institute, but are available to the public for examination.

Sedimentology Laboratory — The Sedimentology Laboratory is used principally for grain-size analyses, carbonate content determinations and heavy mineral separations of unconsolidated sediments. Also, samples are prepared for such studies as sphericity and roundness determinations and clay mineral and volcanic ash identification. The samples, mostly from glacial and post-glacial deposits, are analyzed mainly for aid in correlation, description and determining the genesis of deposits.

WESTERN RESEARCH SECTION, HYDROLOGIC SCIENCES DIVISION,

INLAND WATERS BRANCH

Research by the Western Research Section is designed to investigate various hydrologic phenomena in the prairie and mountain environments. Individual projects include theoretical, laboratory and field studies of dynamics and chemistry of deep flow systems; geochemistry of mineral and thermal springs; taxonomy and ecology of freshwater ostracodes; paleohydrology; and studies of the interaction of the ground surface and lower layers of the atmosphere.

Hydrology Laboratory — The hydrology Laboratory is used for experimental water chemistry investigations; permeability and ion exchange tests; and preparation of samples for the study of freshwater ostracodes. In addition, the laboratory is equipped for the development, testing and maintenance of instruments for recording temperature, conductivity, pH, water levels, and other physical and chemical hydrological parameters.

NATIONAL AIR PHOTOGRAPHIC LIBRARY

SURVEYS AND MAPPING BRANCH

The western branch of the National Air Photographic Library, operated by the Surveys and Mapping Branch, contains aerial photographs of the western provinces, the Yukon and Northwest Territories, and Arctic Islands. This reference photography,

planned at more than 750,000 contact prints, is supplemented by approximately 7,000 flight-line index maps, from which photography of the entire country may be selected. A card index system is maintained which records applicable data for all rolls of Federal Government film.

An examination room has been furnished and equipped to enable the public to study the air photos on file, and trained personnel are available to assist in the selection of desired photography. This Library also serves as an order office where the public can place orders for the purchase of air photographs.



AIR PHOTOGRAPHIC
LIBRARY

CALGARY OFFICE, MINING RESEARCH CENTRE, MINES BRANCH

The Mining Research Centre conducts theoretical, laboratory and field research into problems of rock mechanics and ground control, drilling and blasting, comminution, mining systems and environmental control. The Calgary office is responsible for field studies in Western Canada. Specific projects are investigating ground control problems in coal mines and deep metal mines, and stability of open pit slopes. The effects of geologic structure on the strength of and stresses in rock masses surrounding mining excavations are of particular interest.

CALGARY OFFICE, NATIONAL ENERGY BOARD

This unit consists of a petroleum geologist and petroleum engineer. It uses certain files and facilities of the Institute in making gas and oil reserve evaluations and reports to the National Energy Board in Ottawa.

PURCHASING AND STORES DIVISION, DEPARTMENT OF ENERGY, MINES AND RESOURCES

The Calgary office of the District Purchasing Agent provides purchasing services for all branches and units of the Department located in the Prairie Provinces.

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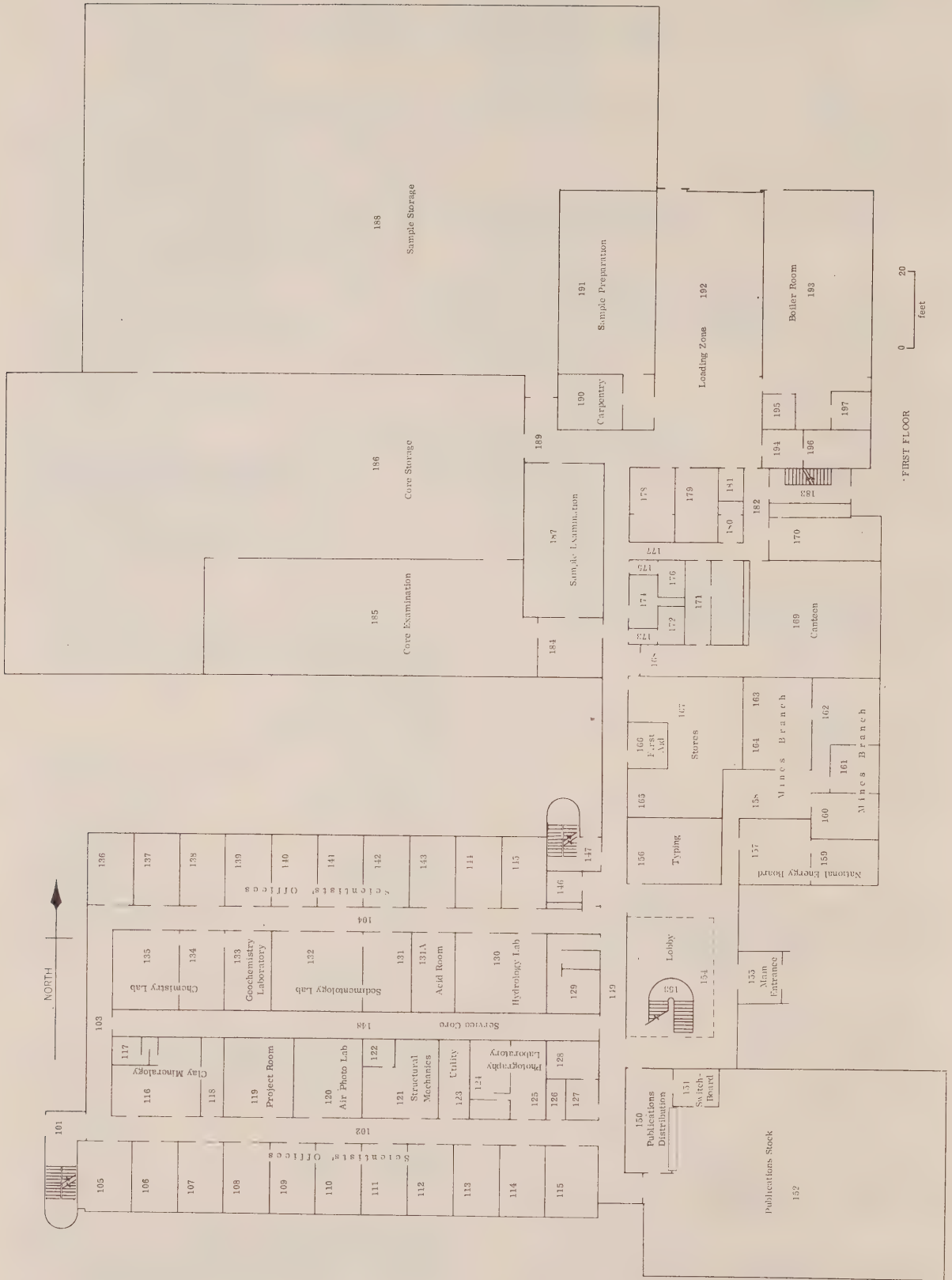
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GEOLOGICAL SURVEY OF CANADA

